

The dressing must be left untouched as long as possible, and as soon as the drainage openings are all closed the fixation apparatus should be removed, so that voluntary motion may begin. Two weeks after the operation, massage is to be begun, and one week later, passive motion. If the course of the wound is not fully aseptic, and it becomes necessary to remove the dressing and re-open the wound, the sutures in the tendons should be left in place, unless it is absolutely necessary to cut them, as union has been known to occur even when slight suppuration was present. But in such cases motion can only be begun when the wound is closed or reduced to a superficial ulcer. If a plastic operation has been done, motion must not be undertaken until four weeks have elapsed.

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A NEW CLASSIFICATION OF TUMORS IN GENERAL AND OF  
TUMORS OF THE TESTICLE IN PARTICULAR.<sup>1</sup>

In a paper of considerable length, Messrs. Monod and Arthraud have developed a complete classification of tumors in general and of the seminal gland in particular in extension of the embryonic theory of Cohnheim. A brief review of the history of the various theories with regard to tumors being considered necessary, they pass rapidly over the earlier hypotheses, beginning with the heteromorphic theory of Laennec, formulated by Lebert and defended by Broca, who considered tumors as parasitic productions absolutely foreign to the constitution of the normal tissues. This was followed by Müller's doctrine of the heterotopia of neoplasms, which he considered to consist of the normal elements, their appearance being referable to a still unknown deviation of the normal evolution of the tissues. In his cellular pathology, Virchow attempted to show the processes employed by the organism to develop these morbid masses in the midst of healthy tissues. The dominant thought of Virchow was the substitution of the observation of present and transient forms of the diseased tissues by the study of the successive transformations which they may undergo;

<sup>1</sup>Considerations sur la classification de tumeurs du testicule. Par le Dr. Ch. Monod et le Dr. G. Arthraud, de Paris, *Revue de chirurgie*, 10 Mars, 1887.

in other words, to replace the idea of form by that of evolution. But in admitting the origin of all tumors from the connective tissues, this author took a step, seductive in its simplicity and destined to great popularity, but not tenable for all tumors. Through the labors of Robin and Waldeyer, a grand class has been detached from Virchow's connective tissue family; this class includes epithelioma with its various grades extending to carcinoma, and their origin should be referred to epithelial proliferation and the hypothesis recognized by the name of epithelial theory of cancer.

The true nature and mode of development of sarcoma is still involved in obscurity, and its study is rendered the most difficult in pathology because of its complexity and the almost infinite variety of type which it presents. However, the investigations of Robin on arachnoidal and peritoneal tumors, Lancereaux on endothelial tumors of the lymphatics of the peritoneum, Gaucher, demonstrating that so-called epithelioma of the spleen developed from the lymphatic and vascular endothelia of the gland; Waldeyer and Malassez defining cylindroma to be primitively an endothelial or perithelial new formation; and Monod and Arthraud showing that certain melanotic tumors of the retina, commonly described as sarcomas, should be considered as endothelial tumors more or less diffuse in form—these investigations have detached from the class of sarcoma as originally constituted certain tumors, the point of origin of which is manifestly in an endothelial surface, and which constitute a distinct anatomical group, that of endothelioma.

It is believed, however, that between sarcoma and endothelioma a relation exists similar to that between carcinoma and epithelioma. Such a relation is excellently shown in the angiolithic sarcoma of the arachnoid, which is in reality a form of endothelioma of the serous membrane and presents numerous varieties extending from the pure endothelial type to sarcoma by transitions which can be followed step by step. Moreover, just as certain epitheliomas sometimes recur and extend under the form of diffuse epithelioma (carcinoma), so also certain pure epitheliomas may be transformed *in situ* or at a distance into diffuse sarcoma. This is true for example in sarcoma of the choroid,

which at the beginning may be considered as a type of endothelial tumor and which, when it recurs after ablation, generalizes in the form of diffuse melanotic sarcoma. It seems legitimate then to conclude that the endothelial type is the common stock of the so-called connective tissue tumors, which differ from one another only as they deviate more or less from the primitive or fundamental form, or become more or less atypical.<sup>1</sup>

We may then deduce from these facts two principal laws, one formulated by Müller: *every tumor is constituted by a tissue analogous to the normal tissues*; the other, deduced from the researches of Virchow; *the elements of tumors are derived from the elements of the organism*.

There is yet much to be learned of the natural history of tumors, and not the least of the points still involved in obscurity is the cause of the appearance of neoplasms. Why does a fraction of tissue, isolating itself from the organism, all at once suddenly or gradually, the more often without apparent cause, develop and assume the proportions and character of a tumor. In some productions this question

<sup>1</sup>The following table defines and summarises the ideas which have been presented.\*

<i>Type adenoma or papilloma.</i>	<i>Type pure endothelioma.</i>	<i>Type metatypical endothelioma.</i>
1. Plexiform angioma (Waldeyer).	1. Angiosarcoma. Cylindroma (Waldeyer, Malassez).	1. Spindle-, or round-celled sarcoma; myeloid sarcoma (Robin, Malassez).
2. Lymphangioma.	2. Lymphangiosarcoma. Ganglionic endothelioma (Chambard, Gaucher). Lymphadenoma (Lancereaux).	2. Lymphosarcoma. Diffuse sarcoma of serous membranes and articulations.
3. Papillary epithelioma of serous membranes and cavities.	3. Endothelioma vulgaris of serous membranes (Robin). Angiolithic sarcoma. Melanotic endothelioma of the eye and skin.	3. Osteosarcoma. Myxosarcoma. Melanotic sarcoma.

\*We consider in epithelial or endothelial tumors three essential types, differing (1) by the nature and morphology of the cellular elements, and (2) by the relations of these elements with the neighboring tissues. The type *adenoma* or *papilloma* is characterized by simple hyperplasia with conservation of the normal form and normal relations. The type *epithelioma* or *endothelioma* is limited to the conservation of the form and alteration of the relations. The type *carcinoma* or *sarcoma* is differentiated from the other two by the simultaneous modification of these two grand characteristics.

has been very satisfactorily answered; the studies of Ponfick on actinomycosis, of Koch on tubercle, of Bouchard, Klebs and Birch-Hirschfeld on glanders, lepra and syphilis have permitted the separation from tumors proper of the specific products of certain maladies under the name of infectious tumors. These pathological products are connected by indisputable relationships, and constitute a natural family, having an etiology almost identical and a common structure and destiny.

In the same way is evident the mechanical or inflammatory cause, leading to the formation of cysts by the retention in a cavity of a secretion which should normally be excreted.

Aside from these cases, the etiology of tumors is very obscure; the facts certainly show that they are neither contagious nor inoculable, and consequently possessed neither of a specific poison nor parasite. Among the various explanations of the origin of tumors the embryonic theory of Cohnheim is attractive by its simplicity and completeness. He holds that all tumors proper are due to some trouble or vice of development. At some period of embryonic life are produced certain involutions of the blastodermic layers, resulting in the formation of an isolated cellular mass in the tissues which remains quiescent and does not assume activity until a period at a greater or less distance from birth.

The various types of tumors and the differences in structure which they present are easily explained by the consideration of the period of embryonic life at which the involution occurred. According, as this was early or late, the elements of the included part are more or less differentiated; when, under an influence still unknown, life is awakened in these dormant elements, the evolution continues at the precise point where it was arrested, and produces either an embryonic tumor, if the arrest has been early, or a tumor formed of adult tissues (fibroma, lipoma, myoma or neuroma) if it has been late. The laws of Müller and Virchow are logical corollaries of this pathogenic theory, since, directly derived from the normal elements of the organism, tumors can produce only the types proper to the cells or tissues which have given birth to them.

Thus constituted, living their own life more or less independent of the rest of the economy, since they have no relation with the nervous system, the regulator of nutrition, these morbid products increase, multiply and reproduce without limit, with a facility and rapidity the greater as the type under which they are evolved approaches nearer the early phases of embryonic life. They employ for their nutrition, like veritable parasites, the materials accumulated from the tissues in the midst of which they are engrafted, determining a sort of cachexia of varying character and, if nothing obstructs their progress, producing death by marasmus, generalization or infection.

The embryonic theory permits the explanation of certain points in the history of neoplasms, among which are hereditary transmission, the influence of traumatism upon the development of tumors, and their appearance preferably at puberty and at the menopause or the onset of old age; it is admitted that at these two periods of life congestions appear, capable, like traumatism of exciting the development of these embryonic masses, arrested in their evolution, and which would otherwise remain quiescent and sterile.

While it is impracticable here to recount all the arguments in favor of this theory, we may remark that dermoid cysts of the ovary and testicle, the congenital origin of which is indisputable, form a class of congenital productions which remain latent for years and may suddenly, preferably at puberty, and the menopause, develop rapidly and unceasingly and without other limit than the life of the patient.

However, a still stronger proof is apparent from the experiments of Masse who grafted into the peritoneum of adult dogs the debris of the tissue of an embryo of the same species, and saw veritable dermoid cysts develop at the point of inclusion. Messrs. Monod and Arthraud consider this demonstration conclusive and an *a posteriori* verification of the hypothesis of Cohnheim that *all true tumors are the result of a vice of embryonic development.*

It should be remarked that they have added the word "true" to the law of Cohnheim and that by *a true tumor* is meant *a new organ which develops at some period of post-embryonic life and which follows in its evolution a course analogous to that which marks its growth at*

*the epoch of primitive organization.* This definition creates in the category of new formations two classes which are often confounded clinically under the general term, tumors. The first class, which alone is considered in this paper, comprises the *true tumors*; in the second class are ranged all the *neoplasms of inflammatory or trophic origin*, which may sometimes present a morphology identical with that of true tumors, but which always differ essentially from them in their progress, duration and evolution. The infectious tumors, belonging to this class, have already been noticed; to this same family may be assigned the hyperplasias of trophic or diathetic origin. Tumors of the sarcomatous family and the granulations of fresh inflammation are identical in structure, but the history shows the former to be tumors and the latter pseudo-neoplasms. Illustrations of this condition may be multiplied, and in many instances it is difficult to exactly locate particular cases.

However, taking the laws of Müller and Cohnheim as a basis and guide, it is possible, by an analysis of the facts now known, to establish by synthesis a really scientific classification of tumors. The following table presents such a classification applied to tumors in general, a subject which Messrs. Monod and Arthraud propose to develop more fully at some future time.